

N00213.AR.001463
NAS KEY WEST
5090.3a

ENGINEERING EVALUATION/COST ANALYSIS FOR MUNITIONS RESPONSE PROGRAM
NON-TIME CRITICAL REMOVAL ACTION FOR A950 SPOILS PILE AND A22 DRAINAGE
DITCH BOCA CHICA AIRFIELD NAS KEY WEST FL
3/1/2014
RESOLUTION CONSULTANTS

**ENGINEERING EVALUATION/COST ANALYSIS
FOR NON-TIME-CRITICAL REMOVAL ACTION**

**A950 Spoils Pile and A22 Drainage Ditch
Boca Chica Airfield
Naval Air Station Key West, Florida**

Prepared for:



**Department of the Navy
Naval Facilities Engineering Command Southeast
Bldg. 135 N, P.O. Box 30
Jacksonville, Florida 32212-0030**

**Comprehensive Long-Term Environmental Action Navy
Contract Number N62470-11-D-8013
CTO JM61**

Prepared by:



**Resolution Consultants
A Joint Venture of AECOM & EnSafe
1500 Wells Fargo Building
440 Monticello Avenue
Norfolk, VA 23510**

March 2014

This page intentionally left blank.

TABLE OF CONTENTS

EXECUTIVE SUMMARY.....	ES-1
1.0 INTRODUCTION.....	1-1
1.1 Purpose and Objectives.....	1-1
1.2 Regulatory Framework.....	1-2
1.3 EE/CA Organization.....	1-2
2.0 SITE CHARACTERIZATION AND BACKGROUND.....	2-1
2.1 Site Location.....	2-1
2.2 Site Background.....	2-1
2.3 A950 Spoils Pile Site Description.....	2-2
2.4 A22 Drainage Ditch Site Description.....	2-2
2.5 Installation and Site Setting.....	2-3
2.5.1 Topography.....	2-3
2.5.2 Climate.....	2-3
2.5.3 Geology.....	2-3
2.5.4 Hydrogeology.....	2-3
2.5.5 Vegetation, Endangered Species, and Ecological Habitat.....	2-3
2.5.6 Surface Water.....	2-4
2.6 Current and Future Land Use.....	2-4
2.7 Previous Investigations and Removal Actions.....	2-4
2.8 Source, Nature, and Extent of Contamination.....	2-5
2.8.1 Source of Contamination.....	2-5
2.8.2 Nature and Extent of Contamination.....	2-5
2.9 Streamlined Risk Evaluation.....	2-5
3.0 IDENTIFICATION OF REMOVAL ACTION OBJECTIVES.....	3-1
3.1 Statutory Limits on Removal Actions.....	3-1
3.2 Determination of Removal Scope.....	3-1
3.2.1 Development of Removal Action Objectives.....	3-1
3.2.2 Identification of Applicable or Relevant and Appropriate Requirements.....	3-1
3.2.3 Removal Action Scope.....	3-3
3.3 Determination of Removal Action Schedule.....	3-4
4.0 IDENTIFICATION AND ANALYSIS OF REMOVAL ACTION ALTERNATIVES.....	4-1
4.1 Alternatives Description.....	4-1
4.1.1 Alternative 1 – No Action.....	4-1
4.1.2 Alternative 2 – Land Use Controls.....	4-1
4.1.3 Alternative 3 – MEC Removal.....	4-2
4.2 Analysis of Removal Action Alternatives.....	4-3
4.2.1 Effectiveness.....	4-4
4.2.2 Implementability.....	4-5
4.2.3 Cost.....	4-5
5.0 COMPARATIVE ANALYSIS OF ALTERNATIVES.....	5-1
5.1 Effectiveness.....	5-1

5.2	Implementability	5-1
5.3	Cost.....	5-1
6.0	RECOMMENDED REMOVAL ACTION ALTERNATIVE	6-1
7.0	REFERENCES.....	7-1

LIST OF APPENDICES

Appendix A	Figures
Appendix B	Applicable or Relevant and Appropriate Requirements
Appendix C	Detailed Cost Estimates

TABLES

Table 4-1	Evaluation Criteria	4-3
Table 4-2	Detailed Analysis of Alternatives for Effectiveness	4-4
Table 4-3	Detailed Analysis of Alternatives for Implementability	4-5
Table 4-4	Summary of Alternative Present Worth Costs.....	4-6

FIGURES

Figure 2-1	Boca Chica Airfield, NAS Key West
Figure 2-2	A950 Spoils Pile Site Plan, Boca Chica Airfield, NAS Key West
Figure 2-3	A22 Drainage Ditch Site Plan, Boca Chica Airfield, NAS Key West
Figure 2-4	Site Location Plan, Boca Chica Airfield, NAS Key West
Figure 4-1	Alternative 2 Proposed Fence Locations, Boca Chica Airfield, NAS Key West
Figure 4-2	Alternative 3 MEC Removal Locations, Boca Chica Airfield, NAS Key West

LIST OF ACRONYMS AND ABBREVIATIONS

AM	Action Memorandum
AR	Aerial Rocket
ARARs	Applicable or Relevant and Appropriate Requirements
CE	Cost Estimate
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CLEAN	Comprehensive Long-Term Environmental Action – Navy
CTO	Contract Task Order
DMM	Discarded Military Munitions
DoD	Department of Defense
DQO	Data Quality Objective
EE/CA	Engineering Evaluation / Cost Analysis
EOD	Explosive Ordnance Disposal
ESS	Explosive Safety Submission
°F	Degrees Fahrenheit
FDEP	Florida Department of Environmental Protection
FL	Florida
HFD	Hazardous Fragment Distance
HVAR	High Velocity Aircraft Rocket
IRA	Interim Removal Action
MC	Munitions Constituents
MD	Munitions Debris
MEC	Munitions and Explosives of Concern
MGFD	Munition with the Greatest Fragmentation Distance
MPPEH	Material Potentially Presenting an Explosive Hazard
MRA	Munitions Response Area
MRP	Munitions Response Program
MRS	Munitions Response Site
msl	mean sea level
NAS	Naval Air Station
NAVFAC	Naval Facilities Engineering Command
NCP	National Oil and Hazardous Substance Pollution Contingency Plan
NTCRA	Non-Time-Critical Removal Action

OSHA	Occupational Safety and Health Administration
OSWER	Office of Solid Waste and Emergency Response
O&M	Operation and Maintenance
PA	Preliminary Assessment
RAO	Remedial Action Objective
RI	Remedial Investigation
SARA	Superfund Amendments and Reauthorization Act
SI	Site Inspection
USEPA	United States Environmental Protection Agency
UXO	Unexploded Ordnance

EXECUTIVE SUMMARY

This document presents an Engineering Evaluation and Cost Analysis (EE/CA) for a Non-Time-Critical Removal Action (NTCRA) for the munitions and explosives of concern (MEC) present in Staging Area A950 Spoils Pile sediments and in Work Area A22 Drainage Ditch sediments at the Boca Chica Airfield, a part of Naval Air Station Key West, Florida. The MEC present in the sediment at these sites presents an explosive hazard to human health.

The purpose of this document is to present and evaluate the removal action alternatives to reduce the MEC explosive hazard at the sites that will meet the remedial action objective of implementing measures that will prevent or minimize contact with sediment containing discarded military munitions which present an explosive hazard to construction workers, personnel, and visitors under current and future land use scenarios. The selected removal action based on this EE/CA will be an interim action with a final remedy selected at a later date.

This EE/CA is being completed as part of an NTCRA as required by 40 Code of Federal Regulations Part 300.415(b)(4)(i) of the National Oil and Hazardous Substance Pollution Contingency Plan. Submittal of this document fulfills the requirements for NTCRAs defined by the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) and the Superfund Amendments and Reauthorization Act 16 of 1986. This EE/CA has been prepared in general accordance with the United States Environmental Protection Agency (USEPA) guidance document *Superfund, Guidance on Conducting Non-Time-Critical Removal Actions under CERCLA*, PB93-963402 (USEPA, 1993).

To reduce the MEC explosive hazard, the following three alternatives were identified and evaluated for potential implementation at the A950 Spoils Pile and A22 Drainage Ditch sites:

1. Alternative 1 – No Action;
2. Alternative 2 – Land Use Controls; and
3. Alternative 3 – MEC Removal.

Through a comparative analysis of the alternatives, Alternative 3 is the recommended removal action alternative for the A950 Spoils Pile and A22 Drainage Ditch sites. Alternative 3 provides the most protection to human health and the environment, fully meets the remedial action objective, and is the most permanent solution in the long-term. Alternative 3 reduces the toxicity, mobility and volume of MEC which is not achieved under Alternatives 1 or 2. Alternative 3 is also the most implementable alternative since it is anticipated to be the most acceptable alternative to regulators.

and the community. The estimated cost of Alternative 3 is significantly higher than Alternative 2, but its overall value is significantly higher since Alternative 3 provides the most protection and is a permanent solution since MEC will be physically removed from the sites.

1.0 INTRODUCTION

This Engineering Evaluation/Cost Analysis (EE/CA) was prepared by Resolution Consultants under the Naval Facilities Engineering Command (NAVFAC) Comprehensive Long-term Environmental Action – Navy (CLEAN) Contract N62470-11-D-8013, Contract Task Order (CTO) JM61. The purpose of this EE/CA is to present and evaluate removal action alternatives as part of a Non-Time-Critical Removal Action (NTCRA). The NTCRA will address discarded military munitions (DMM), a potential explosive hazard, present in sediments at the Staging Area A950 Spoils Pile and the Work Area A22 Drainage Ditch located on Boca Chica Airfield at Naval Air Station (NAS) Key West, Florida. Removal of DMM from the A950 Spoils Pile is needed so that the excavated sediments can safely be reused as fill material. Secondly, removal of the DMM from A22 Drainage Ditch sediments is necessary so that improvements to the stormwater drainage system can safely be completed.

1.1 Purpose and Objectives

This EE/CA provides the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) documentation to support an interim removal action (IRA) at the A950 Spoils Pile and A22 Drainage Ditch sites at Boca Chica Airfield. **The purpose of the EE/CA is to present the Navy's** intent to reduce the hazard to human health and environment from the military munitions, and identify and evaluate removal alternatives to reduce this hazard for current and future use of the site.

Submittal of this document fulfills the requirements for NTCRAs defined by CERCLA, the Superfund Amendments and Reauthorization Act (SARA), and the National Oil and Hazardous Substance Pollution Contingency Plan (NCP). This document follows the United States Environmental Protection Agency's (USEPA's) Office of Solid Waste and Emergency Response (OSWER) Directive 9360.0-32 *Guidance on Conducting Non-Time-Critical Removal Actions Under CERCLA* (USEPA, 1993).

The benefits of using the NTCRA process include promptly addressing health threats and accelerating sites more quickly through the CERCLA response process. The goals of an EE/CA are to identify the objectives of the removal action and to analyze effectiveness, implementability, and cost of various alternatives that may satisfy these objectives. An EE/CA documents the removal action alternatives and the evaluation and recommendation process.

An EE/CA serves an analogous function to, but is more streamlined than, the remedial investigation/feasibility study conducted for remedial actions. The results of an EE/CA and the selected removal alternative will be subsequently summarized in an Action Memorandum (AM) as discussed in Use of Non-Time Critical Removal in Superfund Response Actions (USEPA, 2000).

1.2 Regulatory Framework

This EE/CA is issued by the Department of the Navy under Section 104 of CERCLA and SARA. Section 104 allows an authorized agency to remove the risk of hazardous substances, pollutants, or contaminants at any time, or to take other response measures consistent with the NCP as deemed necessary to protect public health or welfare and the environment. The Navy is delegated the authority to conduct the removal action on Navy properties by Executive Order 12580, which delegates this authority to all federal agencies. The Florida Department of Environmental Protection (FDEP) has the lead role in regulatory oversight for this munitions response program (MRP) IRA at NAS Key West.

The NCP, 40 Code of Federal Regulations (CFR) §300, provides regulations for implementing CERCLA and SARA, and regulations specific to removal actions. The NCP defines a removal action as:

...cleanup or removal of released hazardous substances from the environment, such actions as may be necessary to monitor, assess, and evaluate the threat of release of hazardous substances; the disposal of removed material; or the taking of such other actions as may be necessary to prevent, minimize, or mitigate damage to the public health or welfare or to the environment, which may otherwise result from a release or threat of a release.

This removal action is non-time-critical due to the availability of a six-month planning period from the time the removal action is determined to be necessary (when AM comments are resolved) to the time of initiation of the action. Title 400 CFR §300.415 requires the lead agency to conduct an EE/CA when an NTCRA is planned for a site.

The Navy will select the removal action alternative to be implemented after fulfilling all community involvement requirements. Community involvement requirements for NTCRAs include making the EE/CA available for public review and comment for a period of 30 days. An announcement of the 30-day public comment period on the EE/CA is required in a local newspaper. Written responses to significant comments will be summarized in the AM and will be included in the Administrative Record.

1.3 EE/CA Organization

This EE/CA is organized into the following sections:

- Section 1 Introduction;
- Section 2 Site Characterization and Background;

- Section 3 Identification of Removal Action Objectives;
- Section 4 Identification and Analysis of Removal Action Alternatives;
- Section 5 Comparative Analysis of Alternatives;
- Section 6 Recommended Removal Action Alternative; and
- Section 7 References.

Referenced Tables are incorporated within each section accordingly while referenced Figures are included at the end of the document as Appendix A.

This page intentionally left blank.

2.0 SITE CHARACTERIZATION AND BACKGROUND

This section presents available information on the location; background; description; physical setting; land use; previous investigations and removal actions; and source, nature, and extent of DMM at the A950 Spoils Pile and A22 Drainage Ditch sites at Boca Chica Airfield.

2.1 Site Location

NAS Key West is located in Monroe County in the Florida Keys between the Gulf of Mexico and the Atlantic Ocean (see Figure 2-1). NAS Key West is comprised of 6,249 acres of land distributed over 14 properties, including the Boca Chica Airfield. The Boca Chica Airfield, located on Boca Chica Key, which is east of Key West, was developed in 1940 when the naval base was designated a naval air station. Since the post-war period, NAS Key West has been utilized for operational and training purposes and it remains an operational air station. The A950 Spoils Pile site is located in the northwestern portion of the airfield, and the A22 Drainage Ditch site is located in the southwestern portion of the airfield (Figure 2-1).

2.2 Site Background

During the performance of construction activities to improve stormwater drainage at the A22 Drainage Ditch on 24 October 2012, small arms ammunition was observed. Construction activities at this location included excavation to remove sediment from within the drainage ditch. The small arms ammunition was found adjacent to the ditch where excavated sediment was temporarily placed before being transported to Staging Area A950. After notifying the Navy of their discovery, the construction contractor immediately stopped work with approximately 80% of the planned improvement work completed. The Station's Explosive Safety Officer and Airfield Manager inspected the A22 Drainage Ditch site and concluded that the site is to remain off limits to all personnel until further notice. They also inspected the A950 Spoils Pile site where the construction contractor had placed the sediments excavated from the A22 Drainage Ditch. Upon examining the A950 Spoils Pile, small arms ammunition was also identified on the pile as well as on the ground surface adjacent to the pile. Therefore, the A950 Spoils Pile was also declared as off limits.

During a follow up inspection by the Explosive Safety Officer on 31 October 2012, two suspect objects, or material potentially presenting an explosive hazard (MPPEH), were identified. One object was identified submerged in the A22 Drainage Ditch and one on the A950 Spoils Pile. The Navy Explosive Ordnance Disposal (EOD) Detachment Mayport responded on 1 November 2012 and explosively disposed of the two items. The EOD Detachment made the determination that the item in the A22 Drainage Ditch was an unfuzed intact 5-inch aerial rocket (AR) warhead and was live. The other item on the A950 Spoils Pile was also a 5-inch AR warhead but was not live.

2.3 A950 Spoils Pile Site Description

The A950 Spoils Pile site occupies approximately a half-acre area (approximately 243 feet by 87 feet) in the northwestern portion of Boca Chica Airfield (see Figure 2-2) located in Staging Area A950. Staging Area A950 is a contractor work area used to store construction equipment and stage fill material associated with airfield construction. As part of stormwater drainage improvement activities, an estimated 6,400 cubic yards of sediment was removed from various drainages at the airfield, and transported and placed in Staging Area A950 for eventual reuse as backfill. This pile of excavated sediment, averaging 17 feet tall, comprises the A950 Spoils Pile site. The A950 Spoils Pile site is located adjacent to Building A951, a structure used for storage.

MPPEH and small arms ammunition have been observed on the surface of the spoils pile. As previously indicated, a 5-inch AR warhead was discovered on the pile. This item was determined by Navy EOD to be inert munitions debris. Small arms ammunition, including 50 cal and 7.62 mm rounds and spent casings, were found on the pile as well as on the adjacent ground surface. Warning signs have been posted around the A950 Spoils Pile and the site has been secured with a temporary construction fence.

2.4 A22 Drainage Ditch Site Description

The A22 Drainage Ditch site is approximately 196 feet long, 16 feet wide, and 6 feet deep and is in the southwestern portion of Boca Chica Airfield within the restricted area of the airfield (see Figure 2-3). The A22 Drainage Ditch site runs east-west between Taxiway D and Runway 03. Sediment in the A22 Drainage Ditch was identified for removal as part of stormwater drainage improvement activities and the excavated sediment was transported and placed at Staging Area A950. Approximately 80% of ditch excavation activities were completed prior to the discovery of DMM. The construction contractor has estimated that approximately 110 cubic yards of sediment remains in the drainage ditch for removal.

MPPEH and small arms ammunition have been observed in or adjacent to the drainage ditch. As previously indicated, an unfuzed intact 5-inch AR warhead was discovered submerged in the ditch on the west side of Taxiway D. The item was determined by Navy EOD to be a live item. Small arms ammunition, including 50 cal and 7.62 mm rounds and spent casings, were found on the ground adjacent to the ditch where excavated sediment had been placed by the construction contractor prior to transport to Staging Area A950.

2.5 Installation and Site Setting

2.5.1 Topography

The surface elevation at Boca Chica Airfield ranges from mean sea level (msl) to approximately three feet above msl. The A950 Spoils Pile is an elongated mound with an average height of approximately 17 feet above the ground surface. The A22 Drainage Ditch is in a relatively flat area approximately one foot above msl with an estimated channel depth of 6 feet below ground surface.

2.5.2 Climate

The Florida Keys have a subtropical, marine climate susceptible to tropical storms and hurricanes. The temperature ranges from an average low of 69.4 degrees Fahrenheit (°F) in January to 84.6 °F in July and August with an annual average of 78.0 °F. Average rainfall ranges from 1.73 inches in February to 8.96 inches in September with an annual average of approximately 47 inches (NCDC, 2010). The frequency of hurricanes and tropical storms is greatest between August and October and typically approach from the south and east.

2.5.3 Geology

The subsurface at Boca Chica Airfield is designated as Pleistocene marine sediments, primarily limestone (mapping label Qm). Boca Chica Key is located in the southern zone of the coastal lowlands (Florida Geologic Survey, 2013). Several soil types are present at Boca Chica Airfield. The A950 Spoils Pile and A22 Drainage Ditch sites are within areas mapped as Udorthents-Urban Land Complex (developed land). The poorly drained Cudjoe marl, tidal unit, is also mapped in the vicinity of the sites (USDA NRCS, 1995).

2.5.4 Hydrogeology

The Biscayne Aquifer and the Floridian Aquifer are the two main aquifers underlying the Florida Keys. The Biscayne, part of a surficial aquifer system, is considered one of the most productive and permeable aquifers in the world. Thicknesses range from 20 to 400 feet. Freshwater, however, is frequently subject to salt water intrusion due to the permeability of the Key Largo Limestone underlying the Miami Oolite that forms the base of the islands. The aquifer is thus not used for potable water at Key West. Municipal water is supplied from the mainland.

2.5.5 Vegetation, Endangered Species, and Ecological Habitat

The natural communities on Boca Chica Key incorporate over 2,000 undeveloped acres, including tidal mangroves, transitional wetlands, hardwood hammocks, and coastal zones. Nearshore waters support seagrass, hard-bottom, and patch reef communities. Local wildlife includes birds, reptiles, and small mammals. Some wetland areas in the vicinity of Boca Chica Airfield support several threatened or endangered species. Habitat for the Lower Key Marsh Rabbit, a federally listed

endangered species, is located at various locations on the airfield. However, no known protected species/habitat are located within the limits of the A950 Spoils Pile and A22 Drainage Ditch sites.

2.5.6 Surface Water

The Florida Keys are located between the Atlantic Ocean and the Gulf of Mexico. Rainfall generally runs overland into the sea or percolates into the carbonate subsurface. A network of stormwater ditches drain surface water from the airfield. Surface water is retained in numerous wetlands and basins on Boca Chica Key.

2.6 Current and Future Land Use

Boca Chica Airfield is an active airfield with all support facilities. The airfield supports the pilot training mission and tactical aviation squadrons at NAS Key West. The area to the north of the runways includes operations buildings, transient housing, administrative and recreational facilities. It is anticipated that future land use of Boca Chica Airfield will be the same as current land use.

As noted previously, the planned future use of the 6,400 cubic yards of sediment that comprise the A950 Spoils Pile site is reuse as fill material. The A22 Drainage Ditch site will remain a drainage ditch in the future following the removal of remaining sediments and completion of construction contractor improvements.

2.7 Previous Investigations and Removal Actions

An MRP Preliminary Assessment (PA) (Malcolm Pirnie, Inc. and Osage of Virginia, Inc., 2010) and Site Inspection (SI) (Tetra Tech, 2012) were completed for the Boca Chica Airfield. Five MRP eligible ranges/sites were initially identified at Boca Chica Airfield during the PA investigation. These five munitions response areas (MRAs) included the Rocket Loading Area, Bore Sighting Range, Trap Range, Skeet Range, and Shooting-In-Butt Range (see Figure 2-4). None of the five MRAs correspond to or are located in close proximity to the A950 Spoils Pile or A22 Drainage Ditch sites.

The five MRAs were subsequently investigated during the SI for the presence or absence of munitions and explosives of concern (MEC) and munitions constituents (MC). No records were found identifying the type of munitions used at the MRAs and no evidence of the presence of MEC was observed. The SI concluded that small arms and 20mm target practice rounds would likely have been used at some/all of the four range sites, and rockets were likely transferred from shipping containers to aircraft at the Rocket Loading Area site. Based on SI MC sampling results, polycyclic aromatic hydrocarbons and metals were detected at elevated levels above screening values. The SI concluded that these analytes may or may not be related to past range activities.

As noted above, the A950 Spoils Pile and A22 Drainage Ditch sites, identified subsequent to the PA and SI investigations, are not located within or in close proximity to the five MRAs identified/evaluated during the PA and SI at Boca Chica Airfield. No investigations or removal actions have been conducted to date at the A950 Spoils Pile or A22 Drainage Ditch sites.

2.8 Source, Nature, and Extent of Contamination

2.8.1 Source of Contamination

The source of DMM at the A950 Spoils Pile site is from recent construction activities conducted to improve the **airfield's** stormwater drainage system. Loose sediment deposits containing DMM have been excavated from airfield ditches to improve drainage and transported to Staging Area A950 for reuse as fill material.

The specific action(s) that occurred resulting in the release of DMM into the A22 Drainage Ditch sediments is not known. Unfired munitions may have been disposed of in the drainage ditch but no documentation of this action has been identified. There is no history of MEC or MPPEH use in Work Area 22 (NAVFAC, 2012).

2.8.2 Nature and Extent of Contamination

As previously indicated, DMM including 5-inch AR warheads and .50 caliber and 7.62 mm small arms ammunition have been identified at the A950 Spoils Pile and A22 Drainage Ditch sites. The A950 Spoils Pile occupies an estimated half-acre area measuring approximately 243 feet by 87 feet and is estimated to have an average height of 17 feet above ground surface. DMM may be located throughout the approximately 6,400-cubic yard sediment pile. The A22 Drainage Ditch site is approximately 195 feet long, 16 feet wide, and 6 feet deep. The total volume of sediment remaining to be removed from the ditch to complete the restoration project is estimated to be 110 cubic yards. DMM may be located throughout the 110 cubic yards of remaining ditch sediment.

2.9 Streamlined Risk Evaluation

A streamlined risk evaluation summarizes the threats at a site by identifying the nature and extent of the contaminant release; the pertinent exposure pathways; and the receptors that may be exposed.

Nature and Extent of Release: As previously indicated, MPPEH and/or MEC have been encountered at the A950 Spoils Pile and A22 Drainage Ditch sites and may be present throughout the 6,400 cubic yards of sediment in the A950 Spoils Pile and the 110 cubic yards of sediment remaining in the A22 Drainage Ditch.

Pertinent Exposure Pathways: Based on current/future land use, the primary exposure pathways to MPPEH and/or MEC at the A950 Spoils Pile include contact with items on the surface of the pile or adjacent ground surface, or through contact via intrusive excavation into the pile sediments. For the A22 Drainage Ditch, the primary exposure pathway is through contact via intrusive excavation into the ditch sediments.

Potential Receptors: Reuse of the A950 Spoils Pile sediment as backfill on the station presents an explosive safety hazard to station construction workers, personnel, and visitors. Similarly, excavation of the remaining A22 Drainage Ditch sediment and transport to Staging Area A950 as part of drainage system improvement project presents an explosive safety hazard to station construction workers, personnel, and visitors.

3.0 IDENTIFICATION OF REMOVAL ACTION OBJECTIVES

As discussed in Section 2, DMM in sediment at the A950 Spoils Pile and A22 Drainage Ditch sites present an explosive hazard. Based on available information, evaluation of the hazard, and current/future use plans for the sites, appropriate removal action objectives (RAOs) have been developed for this NTCRA and are presented in this section. In addition, this section discusses the identification of Applicable or Relevant and Appropriate Requirements (ARARs), which are tabulated in Appendix B, and the removal action scope and schedule.

3.1 Statutory Limits on Removal Actions

The NCP (40 CFR Part 300.415) dictates statutory limits of \$2 million and 12 months of USEPA fund-financed removal actions, with statutory exemptions for emergencies and actions consistent with the remedial action to be taken. This removal action will not be USEPA fund-financed but financed by the Navy. The Navy/Marine Corps Installation Restoration Program Manual does not limit the cost or duration of the removal action. However, cost-effectiveness is a recommended criterion for the evaluation of removal action alternatives.

3.2 Determination of Removal Scope

3.2.1 Development of Removal Action Objectives

General requirements of the NCP were considered in the development of RAOs. The NCP requires that the selected action ensures protection of human health and the environment and is consistent with current and future land use. The RAO for the A950 Spoils Pile and A22 Drainage Ditch sites was developed to reduce the explosive safety hazard associated with DMM as described in Section 2. Based on these considerations, the site-specific proposed RAO for the A950 Spoils Pile and A22 Drainage Ditch sites is:

Implement measures that will prevent or minimize contact with sediment containing DMM which presents an explosive hazard to construction workers, personnel, and visitors under current and future land use scenarios.

The NCP also requires that the selected action must also attain ARARs. The following section presents a summary of the identified ARARs.

3.2.2 Identification of Applicable or Relevant and Appropriate Requirements

The Navy has primary responsibility for identifying potential ARARs at the site. The removal action will, to the extent practicable, comply with ARARs under federal law and the laws of the State of Florida. Summaries of potential related environmental and munitions regulations are tabulated in Appendix B.

ARAR evaluation is a two-step process: (1) determination of applicability, and (2) if not applicable, determination of relevance and appropriateness. Applicable requirements are those requirements specific to the conditions at the A950 Spoils Pile and A22 Drainage Ditch sites, and the surrounding Boca Chica Airfield that satisfy all jurisdiction prerequisites of the law or requirements. Relevant and appropriate requirements are those that do not have jurisdiction authority over the particular circumstances at the Boca Chica Airfield, but are meant to address similar situations and are thus suitable for use at these sites. Only requirements that are both relevant and appropriate are considered ARARs. As outlined in 40 CFR §300.415(j), the lead agency may consider the urgency of the situation and the scope of the removal action to be conducted in determining whether compliance with ARARs is practicable. The final determination of federal ARARs will be made when the Navy issues the AM.

The NCP [40 CFR §300.400(g)(2)] specifies the following criteria to be used in the determination of what requirements of environmental laws are relevant and appropriate:

- Purpose of the requirement in relation to the purpose of CERCLA;
- Medium or media regulated or affected by the requirement;
- Substance(s) regulated by the requirement;
- Actions or activities regulated by the requirement;
- Variances, waivers, or exemptions of the requirement;
- Type of place regulated and the type of place affected by the release or CERCLA action;
- Type and size of the facility or structure regulated by the requirement or affected by the release; and
- Consideration of the use or potential use of affected resources in the requirement.

Under CERCLA, only substantive provisions of requirements are considered to be ARARs. Procedural or administrative requirements (e.g., permits) are not considered ARARs. The CERCLA exemption in Section 121(e)(1) [42 USC, Section 9621(e)(1)] states **that "No Federal, State, or local permit shall be required for the portion of any removal or remedial action conducted entirely on-site, where such remedial action is selected and carried out in compliance with this section."** This exemption applies to all administrative requirements, but substantive requirements of the permits must still be attained.

ARARs are divided into three classifications pursuant to USEPA guidance on the ARAR determination process: chemical-specific, location-specific, and action-specific.

Chemical-specific ARARs are health or risk management-based criteria or methodologies applied to site-specific conditions that result in the establishment of a cleanup level. These requirements generally set protective cleanup concentrations for each of the chemicals of concern in the designated media or set safe concentrations of discharge for remedial activity. Because this IRA is only intended to address MEC hazards, any MC concerns identified at the sites will be addressed as a separate munitions response action following the reduction of the explosive safety hazard by the removal of munitions. Thus, chemical-specific ARARs are not addressed as part of this EE/CA.

Location-specific ARARs restrict remedial activities based on the characteristics of the surrounding environments. Location-specific ARARs may include restrictions on actions within wetlands or floodplains, the protection of known endangered species, or restrictions for protected waterways. Federal and Florida location-specific regulations that have been reviewed are summarized in Appendix B.

Action-specific ARARs are requirements that define acceptable treatment and disposal procedures for munitions to ensure the protection of public health and safety. Federal and Florida action-specific ARARs that may affect the procedural aspects of removal alternatives are summarized in Appendix B.

3.2.3 Removal Action Scope

The scope of the MRP IRA for the A950 Spoils Pile and A22 Drainage Ditch sites will need to address the explosive hazard associated with DMM under current and future use scenarios. The following future actions/improvements at the sites are key factors for consideration in determining the removal action scope:

- At the A950 Spoils Pile, the 6,400 cubic yards of excavated sediment has been identified for reuse as fill material; and,
- At the A22 Drainage Ditch, in order for the construction contractor to complete improvements to the stormwater drainage system, the remaining sediments in the drainage ditch need to be removed.

Other important considerations in determining the removal action scope include:

- Selection of an efficient and cost-effective removal action approach;

- Implementation of safe and proven munitions response procedures;
- Minimize impacts to ongoing naval air station operations; and
- Implement without disturbing sensitive environments (e.g., wetlands or identified endangered species).

3.3 Determination of Removal Action Schedule

Upon finalization, the EE/CA will be placed in the Administrative Record and a notice of its availability for public review will be published in the local newspaper. The EE/CA will then be available for a 30-day public comment period. Following the public comment period, responses to significant comments will be prepared and incorporated into the AM.

This removal action is non-time-critical due to the availability of a six-month planning period starting at the time the AM is finalized to the time of initiation of the action. Following the finalization of the AM, the total project period is anticipated to span an estimated 12 months, from the start of the preparation of the planning documents through completion of the IRA after action reporting. This is an estimated schedule for project completion, should critical milestones not be met, the total project timeframe would also be extended. Critical milestone periods related to the removal action schedule are summarized below:

- Preparation of planning documents—four months;
- Performance of field removal action activities—four months; and
- Preparation of after action report—four months.

4.0 IDENTIFICATION AND ANALYSIS OF REMOVAL ACTION ALTERNATIVES

4.1 Alternatives Description

Three removal action alternatives were identified for evaluation in this EE/CA to reduce the DMM explosive hazard for current and future use scenarios at the A950 Spoils Pile and A22 Drainage Ditch sites. These alternatives included:

- Alternative 1 – No Action;
- Alternative 2 – Land Use Controls; and
- Alternative 3 – MEC Removal.

These alternatives were evaluated against meeting the site-specific RAO developed in Section 3 as well as NCP criteria of effectiveness, implementability and cost. A description of each of these alternatives is provided in the following sections.

4.1.1 Alternative 1 – No Action

The No Action alternative consists of no measures being taken to limit or prevent contact with DMM in sediments at the A950 Spoils Pile and A22 Drainage Ditch sites. No administrative or engineering controls, or actions to reduce the toxicity, mobility or volume of DMM would occur under this alternative. As required by CERCLA, the No Action alternative is included in the analysis of removal action alternatives as a baseline for comparison.

4.1.2 Alternative 2 – Land Use Controls

The Land Use Controls alternative would include the installation of physical barriers and signage to limit/prevent human access to the A950 Spoils Pile and A22 Drainage Ditch sites and contact with DMM. As part of this alternative, fencing would be installed along all potential access points of both sites and frequent warning signage would be placed along all potential access points. A 10-foot high chain link fence topped with barbed wire would be constructed around each site. Warning signs identifying the sites as containing DMM which is an explosive hazard would be placed every 100 feet along the fence line. An estimated 1,350 feet of fence and 13 warning signs would be installed as part of this alternative. Intrusive operations would be required during fence installation and require unexploded ordnance (UXO) qualified personnel to perform MEC avoidance. This alternative would also include the seeding of the A950 Spoils Pile with native plants/grasses to establish of a vegetative cover for erosion control purposes. Ongoing operation and maintenance (O&M) efforts, associated with fence and vegetation maintenance, would be required until a final remedy for the site is implemented. The proposed fencing locations at both sites are presented in Figure 4-1.

4.1.3 Alternative 3 – MEC Removal

The MEC Removal alternative would include the physical removal of DMM from A950 Spoils Pile and A22 Drainage Ditch sediments. The removal of DMM from the A950 Spoils Pile sediments would most efficiently be achieved by using a mechanical screening approach given the large volume (6,400 cubic yards) of sediments at the site. The removal of DMM from excavated A22 Drainage Ditch sediment would be conducted via a mag & flag/dig clearance approach.

At the A950 Spoils Pile site, a mechanical screening plant would be mobilized and setup to process spoil pile sediments to remove MEC and recoverable small arms ammunition. The screening plant would be comprised of a vibrating feeder with 3-inch screen, an impactor that will break up material passing through the 3-inch screen, a magnet to remove ferrous material, an half-inch screen to remove intact small arms ammunition, and a radial stacker (conveyor belt) to stage the processed material in piles. The screening plant and excavator feeding the plant would be armored to withstand an unintentional detonation of a munition during excavation and processing of the pile. A safety exclusion zone would be setup around the plant operation based on the hazardous fragmentation distance (HFD) of the munition with greatest fragmentation distance (MGFD). Assuming a 5-inch high velocity aircraft rocket (HVAR) rocket (warhead or motor) is the MGFD, this safety exclusion distance or arc around the screening plant operation would be approximately 349 to 428 feet. Recovered MEC items would be destroyed via explosive detonation by a UXO clearance team. Safe-to-move items would be taken to a remote location on the station for detonation with donor explosives. Unidentifiable items or items not safe to move may require Navy EOD response.

At the A22 Drainage Ditch site, the remaining sediment would be mechanically excavated from the drainage ditch and spread on the ground surface adjacent to the ditch for manual mag & flag/dig clearance by a UXO clearance team. An excavator armored to withstand an unintentional detonation of a munition would be used to initially excavate the sediments from the ditch. The sediments would then be spread out on the adjacent ground surface and swept for MEC by a UXO clearance team. After MEC removal, the sediments will be transported to Stockpile Area A950 and mixed with the spoils pile material for processing through the screening operation to remove recoverable small arms ammunition. Due to the location of the A22 Drainage Ditch on the airfield, the safety exclusion zone (based on the 5-inch HVAR HFD) covers a portion of the airfield runway and taxiway. Additionally, a maximum vertical fragmentation distance of 1,804 ft has been identified as an air traffic safety distance. Based on these safety distances, advanced coordination with the flightline will be needed to schedule the work at the A22 Drainage Ditch site to limit impacts to flight operations. Recovered MEC at the A22 Drainage Ditch site will be managed in the same manner as described above for the A950 Spoils Pile site.

4.2 Analysis of Removal Action Alternatives

Each of the three removal action alternatives were evaluated using the effectiveness, implementability, and cost criteria set forth in the NCP and the USEPA guidance for conducting EE/CAs. Each evaluation criterion is described in Table 4-1.

Table 4-1
Evaluation Criteria

Effectiveness	
Protection of human health and the environment	The assessment describes how the action achieves and maintains protection of human health and the environment and achieves site-specific RAOs both during and after implementation.
Compliance with ARARs	An alternative is assessed in terms of its compliance with ARARs, or if a waiver is required, how it is justified.
Short-term effectiveness	An action is assessed in terms of its effectiveness in protecting human health and the environment during the implementation of a remedy before RAOs have been met. The duration of time until the RAOs are met is also factored into this criterion.
Long-term effectiveness and permanence	An action is assessed in terms of its long-term effectiveness in maintaining protection of human health and the environment after RAOs have been met. The magnitude of residual risk and adequacy and reliability of post-remedial site controls are taken into consideration.
Reduction of toxicity, mobility or volume	An action is assessed in terms of anticipated performance of the specific remedial technologies it employs. Factors such as volume of MEC removed or destroyed and the degree of expected reductions in exposure to hazards within the removal action site.
Implementability	
Technical feasibility	The ability of the technology to implement the remedy is evaluated.
Administrative feasibility	The administrative feasibility factor evaluates requirements for permits, zoning variances, impacts on adjoining property, and the ability to impose institutional control.
Availability of services and materials	The availability of off-site treatment, storage, and disposal capacity, personnel, services, and materials, and other resources necessary to implement the alternative will be evaluated.
State and community acceptance	The acceptability of an alternative to the state agency and the community is evaluated.
Cost	
Direct and indirect capital costs	Includes capital costs for fence installation, MEC clearance, equipment and materials, munitions storage and services, engineering and design, and permit/licenses.
Operations and maintenance costs	Includes ongoing operating, monitoring and maintenance costs for a specific period.

4.2.1 Effectiveness

The effectiveness of a technology refers to its capability of removing the specific items in the volume required, the degree to which the technology achieves the RAO, and the reliability and performance of the technology over time, including protection of human health and the environment, compliance with ARARs to the extent practical, long-term effectiveness and permanence, reduction in explosive safety hazard, and short-term effectiveness.

As described in Section 2, the site-specific RAO is to implement measures that will prevent or minimize contact with sediment containing DMM which presents an explosive hazard to construction workers, personnel, and visitors under current and future land use scenarios. Levels of effectiveness were assessed based on the number of effectiveness criteria, summarized in Table 4-1, satisfied by each alternative. Table 4-2 provides the detailed analysis of each alternative by the effectiveness criteria.

Table 4-2
Detailed Analysis of Alternatives for Effectiveness

Criterion	Alternative 1: No Action	Alternative 2: Land Use Controls	Alternative 3: MEC Removal
Protection of human health and the environment	Does not provide protection of human health and the environment. Does not meet RAO.	Provides protection to human health by limiting access to MEC. However, alternative does not meet RAO for future use of sediment as fill material and removal of drainage ditch sediments associated with stormwater drainage improvements.	Provides highest level of protection to human health and the environment by MEC removal. Meets RAO.
Compliance with ARARs	Compliant with ARARs since no action taken.	Anticipated to be compliant with ARARs.	Anticipated to be compliant with ARARs.
Short-term effectiveness	Protective of human health and environment during implementation since no action taken.	Worker and station personnel protection would be assured during implementation through use of UXO qualified personnel and implementation of MEC safety standards and procedures.	Worker and station personnel protection would be assured during implementation through use of UXO qualified personnel and implementation of MEC safety standards and procedures.
Long-term effectiveness and permanence	Does not provide long-term effectiveness and permanence.	Long-term effectiveness is provided as long as controls remain in place and are heeded during life of alternative.	Long-term effectiveness and permanence is provided by MEC removal.
Reduction of toxicity, mobility or volume	Does not reduce toxicity, mobility or volume of MEC.	Does not reduce toxicity, mobility or volume of MEC, but does limit human exposure via controls.	Reduces toxicity, mobility and volume of MEC by MEC removal/treatment.

4.2.2 Implementability

The ease of implementation of a technology refers to the availability of commercial services to support it, the constructability of the technology under specific site conditions, and the acceptability of the technology to all parties involved (e.g., regulators, public, airfield operations). These criteria include technical feasibility, administrative feasibility, availability of services, support agency acceptance, and community acceptance. Levels of implementability were assessed based on the number of implementability criteria, summarized in Table 4-1, satisfied by each alternative. Table 4-3 provides the detailed analysis of each alternative by the implementability criteria.

Table 4-3
Detailed Analysis of Alternatives for Implementability

Criterion	Alternative 1: No Action	Alternative 2: Land Use Controls	Alternative 3: MEC Removal
Technical feasibility	Technically implementable.	Technically implementable.	Technically implementable.
Administrative feasibility	Administratively implementable.	Administratively implementable.	Administratively implementable.
Availability of services and materials	Available services and materials.	Available services and materials.	Available services and materials.
State and community acceptance	Not evaluated at this time pending regulator and community review. However, anticipate acceptance is not likely.	Not evaluated at this time pending regulator and community review. However, anticipate acceptance to be only moderately likely.	Not evaluated at this time pending regulator and community review. However, anticipate acceptance.

4.2.3 Cost

For the detailed cost analysis of alternatives, the expenditures required to complete each alternative were estimated in terms of capital costs and O&M costs. Capital costs include costs to complete initial removal activities. O&M costs will be incurred to ensure the integrity of the land use controls. Indirect costs include engineering expenses. By combining the different costs associated with each alternative, a present worth calculation for each alternative can be made for comparison.

The costs estimated for this section are provided to an accuracy of +50 percent and -30 percent. The alternative cost estimates are in 2013 dollars and are based on information from past and ongoing MEC removal actions. Previous removal action costs, quotes, and engineering estimates have been used for unit pricing. A summary of the present worth costs for each alternative are provided in Table 4-4 and detailed costing backup for Alternatives 2 and 3 is provided in Appendix C. There are no costs associated with Alternative 1, No Action.

Table 4-4
Summary of Alternative Present Worth Costs

Alternative	Estimated Cost
Alternative 1 – No Action	\$0
Alternative 2 – Land Use Controls	\$198,800
Alternative 3 – MEC Removal	\$1,377,100

5.0 COMPARATIVE ANALYSIS OF ALTERNATIVES

This section provides a comparative evaluation of the removal action alternatives in terms of effectiveness, implementability, and cost.

5.1 Effectiveness

Based on Section 4 analysis, the overall effectiveness of Alternatives 1, 2, and 3 are low, moderate, and high, respectively. Alternative 1 provides no protection to human health and the environment and does not achieve the RAO. Alternative 2 provides protection to human health but does not fully achieve the RAO. Alternative 3 provides protection to human health and the environment and achieves the RAO.

Alternatives 2 and 3 are anticipated to be compliant with ARARs and be effective in the short-term. Alternative 3 is the most permanent solution in the long-term, and reduces the toxicity, mobility and volume of MEC which is not achieved under Alternatives 1 or 2.

5.2 Implementability

Based on Section 4 analysis, all three of the alternatives are implementable from a technical, administrative, and services/materials perspective. However, Alternative 3 is the most implementable alternative since it is anticipated to be the most acceptable alternative by regulators and the community.

5.3 Cost

The present worth costs of each of the alternatives were summarized in Table 4-4. The detailed cost breakdown for each alternative is provided in Appendix C. Alternative 3 is the most costly alternative but provides the most protection and is a permanent solution since MEC will be physically removed from the sites. Alternative 2 is more cost-effective than Alternative 3 but is not a permanent solution since MEC would remain at the sites.

This page intentionally left blank.

6.0 RECOMMENDED REMOVAL ACTION ALTERNATIVE

This EE/CA was performed in accordance with current USEPA guidance documents for an NTCRA under CERCLA. Three alternatives were analyzed based on evaluation of the effectiveness, implementability, and cost. The effectiveness evaluation included reviewing the protectiveness of human health and the environment, the short- and long-term effectiveness of the alternative, and its ability to meet the RAO and ARARs. Implementability included assessing the technical feasibility, administrative feasibility, availability of services/equipment, and state/community acceptance of the alternative. The evaluation of cost included a review of capital costs, operating costs, and present worth costs.

Alternative 3, MEC Removal, at the A950 Spoils Pile and A22 Drainage Ditch sites is the recommended alternative. The following factors were used for making the recommendation:

- Alternative 3 is the alternative that provides the most protection to human health and the environment. Alternative 3 is the only alternative that fully meets the RAO. Alternative 3 is anticipated to meet ARARs and is the most permanent solution in the long-term. Alternative 3 reduces the toxicity, mobility and volume of MEC which is not achieved under Alternatives 1 or 2.
- All three of the alternatives are implementable from a technical, administrative, and services/materials perspective. However, Alternative 3 is the most implementable alternative since it is anticipated to be the most acceptable alternative to the regulators and the community.
- The estimated cost of Alternative 3 is significantly higher than Alternative 2, but its overall value is significantly higher since Alternative 3 provides the most protection and is a permanent solution since MEC will be physically removed from the sites. Alternative 2 is more cost-effective than Alternative 3 but is not a permanent solution since MEC would remain at the sites. In addition, it should be noted that the opportunity cost associated with reuse of excavated sediments was not incorporated into the calculation.

Implementation of this IRA using Alternative 3 will address the potential MPPEH/MEC in sediment at the sites. By implementing Alternative 3, it is anticipated that the final remedy will only need to address MC at the sites.

This page intentionally left blank.

7.0 REFERENCES

- EODMU Six Detachment Mayport. (2012). *Explosive Ordnance Disposal Incident Report*. Mayport, FL: EODMU Six Detachment Mayport.
- Florida Geologic Survey. (2013). *Geologic Map of the State of Florida*. Retrieved June 03, 2013, from Florida Geological Survey Data and Maps: <http://www.dep.state.fl.us>
- Malcolm Pirnie, Inc. and Osage of Virginia, Inc. (2010). *Preliminary Assessment for the Site Visit / Data Collection Summary Report, Navy Munitions Response Program, Naval Air Station, Key West, Florida*. Malcolm Pirnie, Inc. and Osage of Virginia, Inc.
- NAVFAC. (2012). *Munitions Response Site Identification and Notification Report*. Jacksonville, FL: NAVFAC.
- NAVFAC. (2013). *Statement of Work No. SABS0113*. Jacksonville, FL: NAVFAC.
- NCDC. (2010). *Climate Normals 1981 - 2010*. Retrieved February 27, 2012, from NCDC Climate Normals: <http://ggweather.com/normals/MD.html>
- Resolution Consultants. (2013). *Plan of Action / Cost Estimate, Munitions Response Program Interim Removal Action, A-950 Spoil Pile and A22 Ditch*. Alexandria, VA: Reolution Consultants.
- Tetra Tech. (2012). *Site Inspection Report for Munitions Response Program Site Inspections at Fourteen Munitions Response Program Sites*. King of Prussia, PA: Tetra Tech.
- USDA NRCS. (1995). *Soil Survey of Monroe County, Keys Area, Florida*. Washington, DC: U.S. Department of Agriculture Natural Resources Conservation Service.
- USEPA. (1993). *OSWER Directive 9360.0-32, Guidance on Conducting Non-Time Critical Rmoeval Actions Under CERCLA*. Washington, DC: USEPA.
- USEPA. (2000). *Use of Non-time Critical Removal Authority in Superfund Response Actions*. Washington, DC: USEPA.

This page intentionally left blank.

APPENDIX A

FIGURES

This page intentionally left blank.



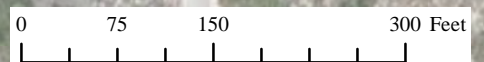
L:\Common\GIS_Data\NAS Key West\MXD\TO_JM61\Figure_2-2.mxd



Legend



A950 Spoils Pile Site



Boca Chica Airfield, NAS Key West

FIGURE 2-2

A950 Spoils Pile Site Plan
Boca Chica Airfield, NAS Key West

CONTRACT NO
#####

TASK NO
JM61

DESIGNED BY
K. Weber

DRAWN BY
K. Weber

CHECKED BY
G. Kitchens

DATE
July 2013


SCALE
1" = 150'

SHEET
1 of 1

Figure_2-2.mxd



Legend

 A22 Drainage Ditch site



Boca Chica Airfield, NAS Key West

FIGURE 2-3

A22 Drainage Ditch Site Plan
Boca Chica Airfield, NAS Key West

CONTRACT NO
#####

TASK NO
JM61

DESIGNED BY
K. Weber

DRAWN BY
K. Weber

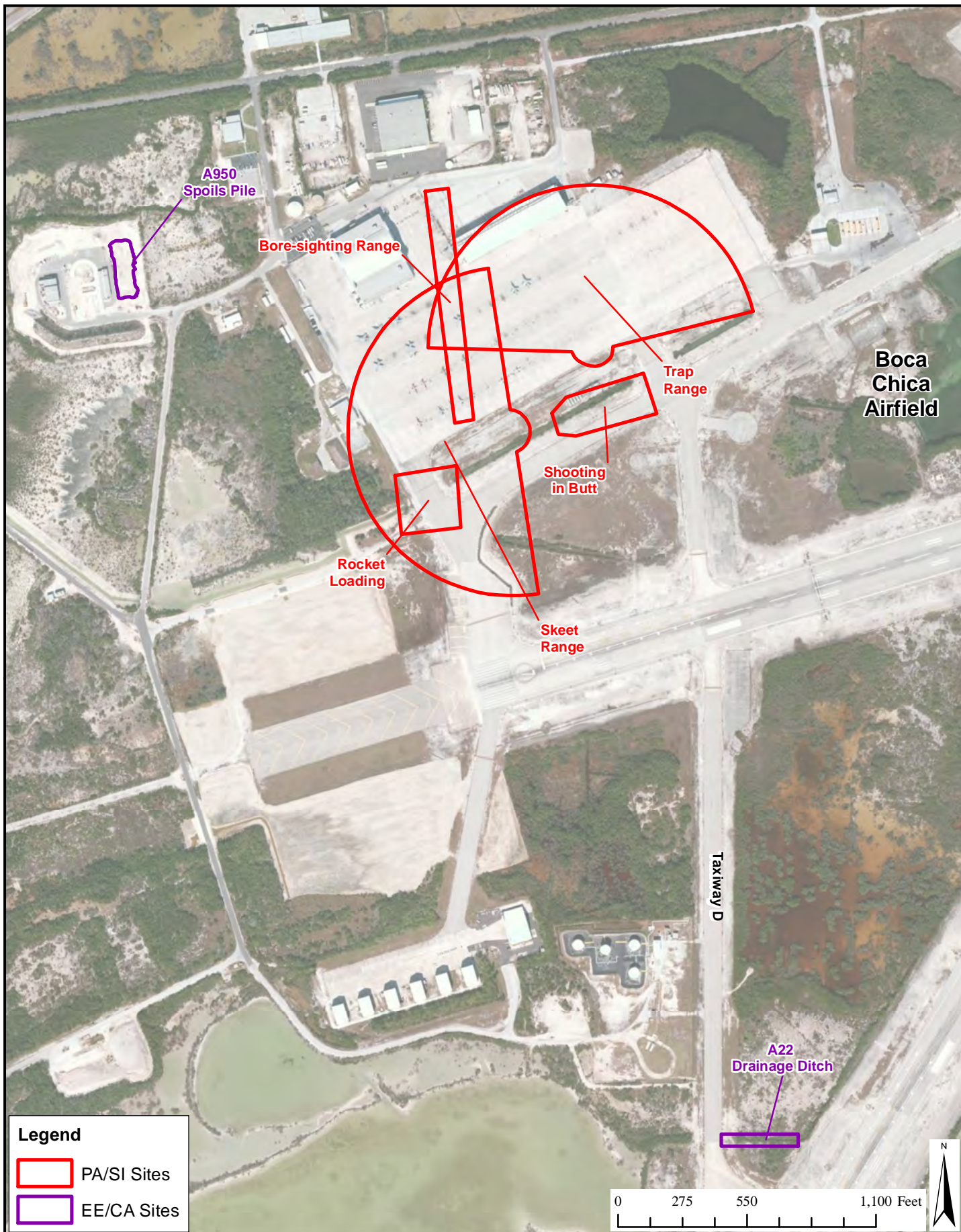
CHECKED BY
G. Kitchens

DATE
July 2013

SCALE
1" = 150'

SHEET
1 of 1

Figure_2-3.mxd



Legend

- PA/SI Sites
- EE/CA Sites



Boca Chica Airfield, NAS Key West

FIGURE 2-4

Site Location Plan
Boca Chica Airfield, NAS Key West

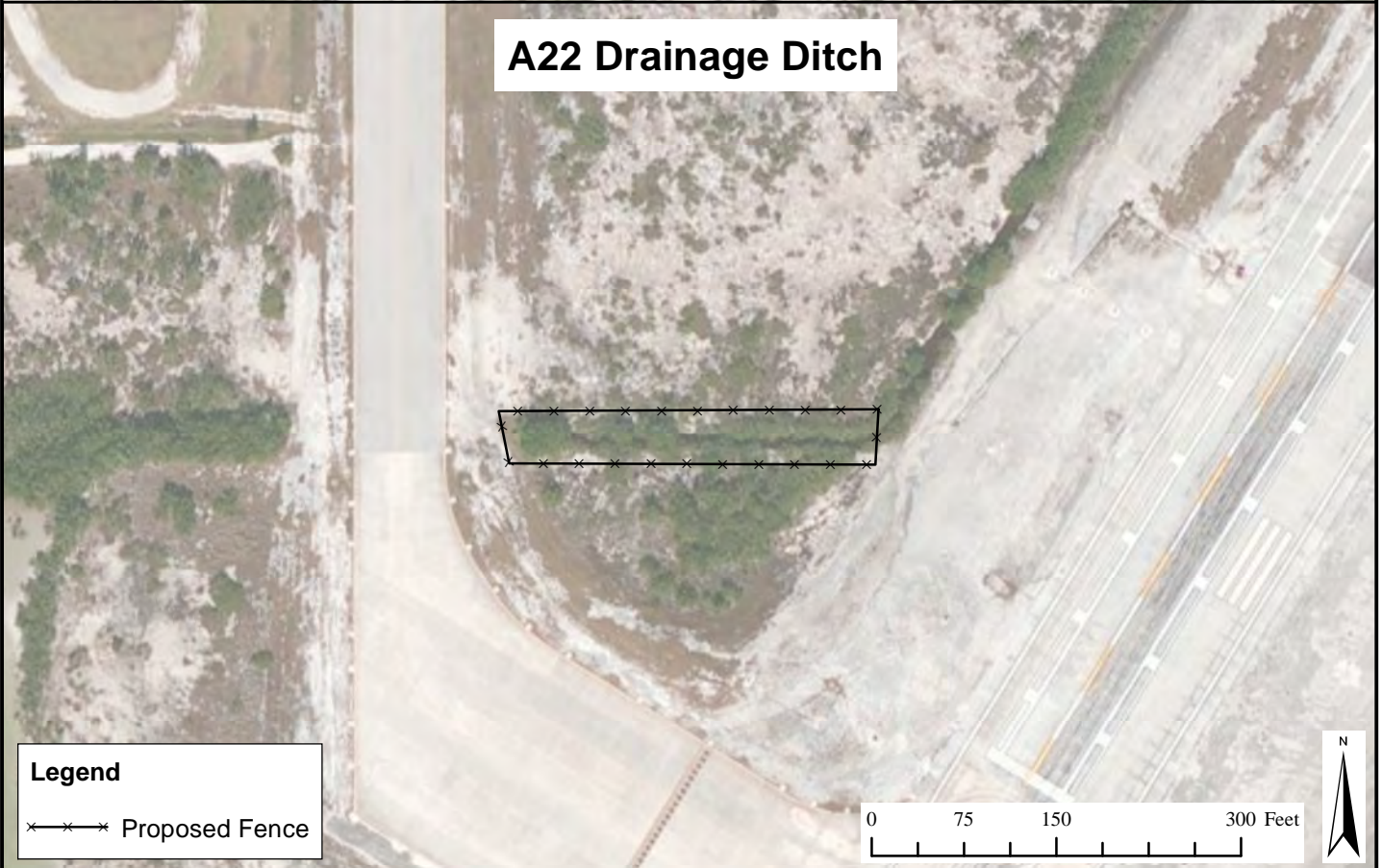
CONTRACT NO #####	TASK NO JM61
DESIGNED BY K. Weber	DRAWN BY K. Weber
CHECKED BY G. Kitchens	DATE July 2013
SCALE 1" = 1,100'	SHEET 1 of 1

Figure_2-4.mxd

A950 Spoils Pile



A22 Drainage Ditch



Legend

—x—x—x— Proposed Fence

0 75 150 300 Feet



Boca Chica Airfield, NAS Key West

FIGURE 4-1

Alternative 2 Proposed Fence Locations
Boca Chica Airfield, NAS Key West

CONTRACT NO
#####

TASK NO
JM61

DESIGNED BY
K. Weber

DRAWN BY
K. Weber

CHECKED BY
G. Kitchens

DATE
July 2013

SCALE
1" = 150'

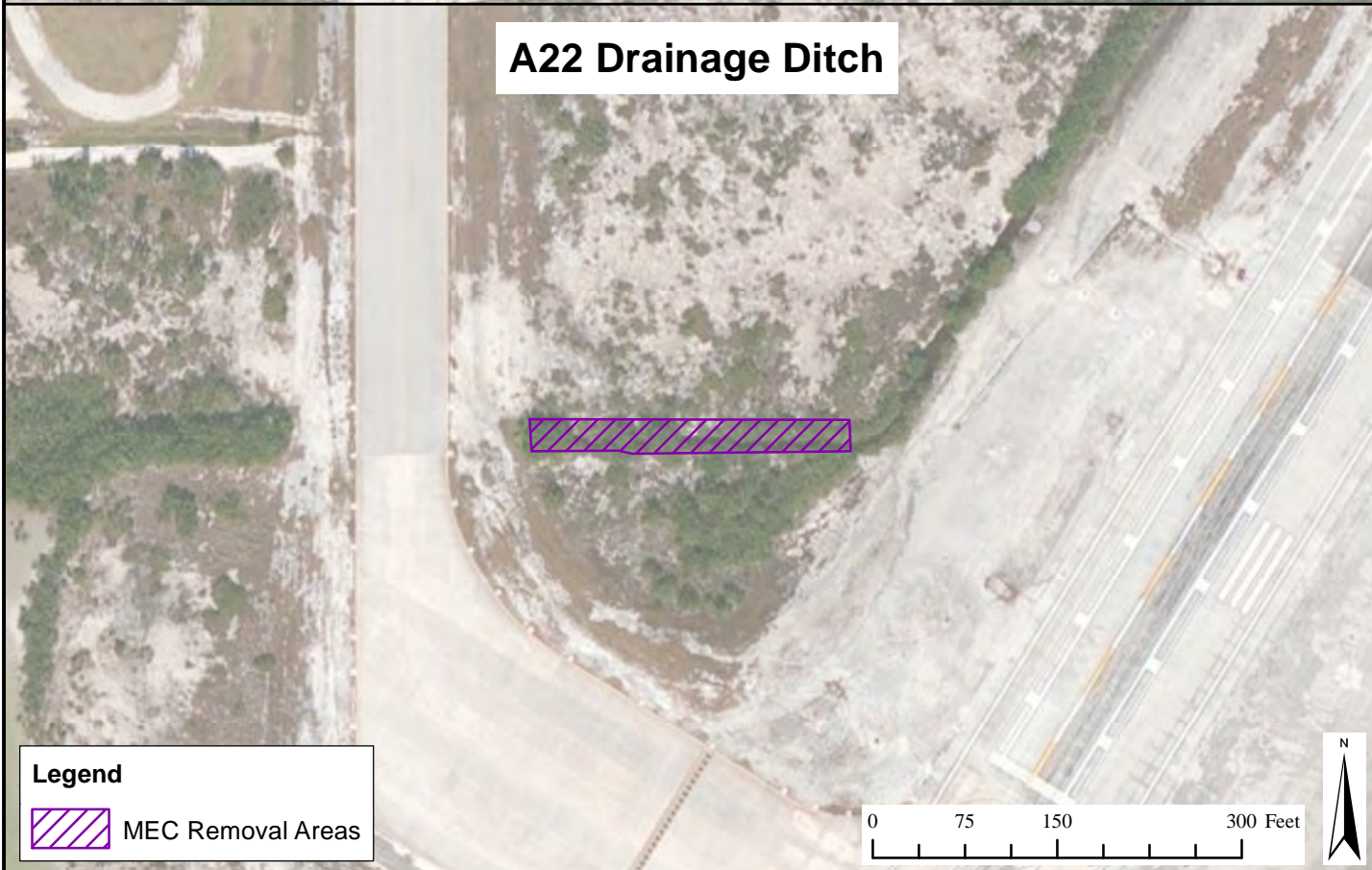
SHEET
1 of 1

Figure_4-1.mxd

A950 Spoils Pile



A22 Drainage Ditch



Legend

 MEC Removal Areas

0 75 150 300 Feet



Boca Chica Airfield, NAS Key West

FIGURE 4-2

Alternative 3 MEC Removal Locations
Boca Chica Airfield, NAS Key West

CONTRACT NO #####	TASK NO JM61
DESIGNED BY K. Weber	DRAWN BY K. Weber
CHECKED BY G. Kitchens	DATE July 2013
SCALE 1" = 150'	SHEET 1 of 1

Figure_4-2.mxd

APPENDIX B

APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

This page intentionally left blank.

Location-Specific ARARs A950 Spoils Pile and A22 Drainage Ditch, Boca Chica Airfield, NAS Key West			
Standard, Requirement, or Criteria	Citation	ARAR Determination	Comment
Federal			
Protection of Floodplains	40 CFR §6 Section 302 and App A	Relevant and appropriate	Actions taken should avoid adverse effects, minimize potential harm, restore and preserve natural and beneficial values. Applies to action that will occur in a floodplain (i.e., lowlands and relatively flat areas adjoining inland and coastal waters and other flood prone areas).
Protection of Wetlands	40 CFR §230 and 232; 33 CFR §320-336	Relevant and appropriate	Action to minimize the destruction, loss, or degradation of wetlands. Applies to wetland as defined by Executive Order 11990 Section 7. Federal regulated wetlands are present. Nationwide Permit No. 38 allows for activities in wetlands to contain, stabilize, or remove hazardous or toxic materials. Notification is required to the District Engineer and the wetlands on the site should be delineated. Activities undertaken entirely on a CERCLA site by authority of CERCLA, as approved or required by EPA, are not required to obtain permits under Section 404 of the Clean Water Act or Section 10 of the Rivers and Harbors Act, although the substantive requirements of these permits shall be met. NWP 38 notification will put in place coordination with natural resource and historic resource trustees regarding the potential to adversely affect threatened and endangered species and sites protected under the National Historic Preservation Act.

<p style="text-align: center;">Location-Specific ARARs</p> <p style="text-align: center;">A950 Spoils Pile and A22 Drainage Ditch, Boca Chica Airfield, NAS Key West</p>			
Standard, Requirement, or Criteria	Citation	ARAR Determination	Comment
Clean Water Act, Section 404	40 CFR §230.10; 40 CFR §231 (231.1, 231.2, 231.7, 231.8)	Relevant and appropriate	Action to prohibit discharge of dredged or fill material into wetland without permit. Applies to wetland as defined by Executive Order 11990 Section 7. NTCRA may include removal and restoration of wetland sediments. Activities undertaken entirely on a CERCLA site by authority of CERCLA, as approved or required by EPA, are not required to obtain permits under Section 404 of the Clean Water Act or Section 10 of the Rivers and Harbors Act, although the substantive requirements of these permits shall be met.
Endangered Species Act of 1978	16 USC 1531; 50 CFR §402	Relevant and appropriate	Action to ensure that any action is not likely to jeopardize the continued existence of endangered or threatened species or adversely affect its critical habitat. Applies to actions that affect endangered or threatened species or their habitat. Federally listed or proposed endangered species are known to exist in the vicinity of the Boca Chica Airfield. A consultation with US Fish and Wildlife Service as necessary will be completed under this ARAR.
Federal Fish and Wildlife Conservation Act	16 USC §662 et seq.	Relevant and appropriate	Applies to actions that affect fish and wildlife and their habitat. Requires that activities avoid, minimize, or compensate for impacts to fish and wildlife and their habitats.
Coastal Zone and Management Act	16 USC §1451 et seq.	Relevant and appropriate	Requires that activities conducted within a coastal zone be consistent with an approved state management program. Applies to sites located within a coastal zone. The Boca Chica Airfield is located within the coastal zone. Activities will be conducted in accordance with applicable management program(s).

Location-Specific ARARs A950 Spoils Pile and A22 Drainage Ditch, Boca Chica Airfield, NAS Key West			
Standard, Requirement, or Criteria	Citation	ARAR Determination	Comment
National Historical Preservation Act (NHPA) of 1966 and Archaeological Resources Protection Act of 1979	NHPA: 16 USC §470; ARPA: 36 CFR §65	Relevant and appropriate	Provides for the recovery and preservation of historical and archaeological significant artifacts. Implementing regulations for NHPA (36 CFR §65) establishes the National Register of Historic Places and provide for preservation of historic properties and minimization of damage to historic landmarks. Applies to historical properties and landmarks, and archaeological artifacts. Based on historical site use, it is not likely that historical landmarks or artifacts exist in the immediate vicinity.
State of Florida			
Florida Floodplain Protection	Florida Administrative Regulation (FAR) 62-40.458	Relevant and appropriate	Actions taken should be to avoid significant adverse impacts to floodplains. Applies to all areas of floodplains including surface and groundwater flows and natural water storage and water conveyance capabilities.
Florida Wetland Protection Act	Warren S. Henderson Wetlands Protection Act of 1984, Florida Statute (FS) §403.91	Relevant and appropriate	Actions should be taken to protect, preserve, and restore wetland habits potentially impacted by work conducted near wetland areas.
Florida Endangered and Threatened Species Act of 1977	FS §379.2291-379.231; West's F.S.A §379.2291-379.231	Relevant and appropriate	Applies to actions that affect endangered fish and wildlife and their habitat. Requires that activities avoid, minimize, or compensate for impacts to fish and wildlife and their habitats.
Florida Environmental Control Act	FS §403.011-403.973	Relevant and appropriate	Provides protection to the air and water from the impact of human actions from plants, wildlife, and other humans. Requires that all work conducted does not detrimentally impact air or water pathways to these target groups.
Florida Costal Management Act of 1978	FS §380.012-380.285	Relevant and appropriate	Requires that activities conducted within a coastal zone be consistent with the federal management program. Applies to sites located within a coastal zone. The Boca Chica Airfield is located within the coastal zone. Activities will be conducted in accordance with applicable management program(s).

This page intentionally left blank.

Action-Specific ARARs A950 Spoils Pile and A22 Drainage Ditch, Boca Chica Airfield, NAS Key West			
Standard, Requirement, or Criteria	Citation	ARAR Determination	Comment
Federal			
Environmental Protection Agency (EPA) Final Military Munitions Rule	40 CFR §260-266 and 270	Applicable	Remedial actions generate munitions that are subject to RCRA requirements. The NTCRA for A950 and A22 will likely generate military munitions waste which may be classified as hazardous.
Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, Military Munitions; Superfund Amendments and Reauthorization Act (SARA) of 1986	40 CFR §266; 42 USC §11001	Applicable	Removal of any munitions material from A950 or A22 will follow the regulations set forth in the regulation.
Hazardous Chemical Reporting and Community Right-to-Know	40 CFR §370	Applicable	Removal actions at A950 and A22 will follow the community involvement requirements.
National Oil and Hazardous Substances Pollution Contingency Plan (NCP)	42 USC §9601; 40 CFR §300	Applicable	Removal actions at A950 and A22 will follow the requirements of the NCP.
Solid Waste Disposal Act (SDWA), hazardous waste characterization	42 USC §6901-6987; 40 CFR §261-262; Subpart C	Applicable	Potential exists for solid wastes to be classified as hazardous waste. Requirements are applicable to hazardous wastes held on site prior to off-site disposal.
State of Florida			
Florida Hazardous Waste Rule	Florida Administrative Code (FAC) 62-730	Applicable	Pertains to the identification, management, and transfer of hazardous waste. Requirements are applicable to hazardous wastes held on site prior to off-site disposal.
Emergency Detonation or Thermal Treatment of certain hazardous waste	FAC 62.730.320	Applicable	Applies to detonation of UXO and other munitions upon discovery.
Solid Waste Management	FAC 62-701 through 62-740	Applicable	Applies to the sampling, evaluation, and handling of solid wastes. Requirements are applicable to hazardous wastes held on site prior to off-site disposal.

Action-Specific ARARs A950 Spoils Pile and A22 Drainage Ditch, Boca Chica Airfield, NAS Key West			
Standard, Requirement, or Criteria	Citation	ARAR Determination	Comment
Erosion and sediment control	FAC 62-25, 62-40	Relevant and appropriate	No direct standard or requirement, only that the impacts of sediment caused by erosion does not impact the water quality standards set forth by the water resources regulations. Measures must be put in place to retain sediment on site during removal action and BMPs should be used during and following land disturbance.
Coastal construction	FAC 62B-33	Relevant and appropriate	Pertains to activities within Florida coastal zones. Substantive provisions of the regulations are relevant.
Explosives Storage/Use/Management	Florida Statutes Chapter 552	Relevant and appropriate	Pertains to the handling and transport of explosives and permitting necessary for such activities. Will become necessary if handling SSA from the spoils pile.

APPENDIX C

DETAILED COST ESTIMATES

This page intentionally left blank.

Table C-1
Detailed Cost Estimate
Alternative 2 (Land Use Controls) - A950 Spoils Pile and A22 Drainage Ditch EE/CA
NAS Key West, FL

Cost Estimate Assumptions				
linear feet of fence				1350
number of gates				3
number of signs				13
installation ft/week with signs				700
number of weeks/days to install				2/10
fencing subcontractor (crews)				2
UXO Technicians (person)				2
Oversight/supervision (person)				1
hours (10 hours/day)				100
Task Description	Unit	Quantity	Cost	Total
1.0 Planning documents				\$24,100
1.1 Work Plan	LS	1	\$13,800	\$13,800
1.2 HASP	LS	1	\$10,300	\$10,300
2.0 Implementation				\$154,900
2.1 Mobilization/Demobilization	LS	1	\$6,400	\$6,400
2.2 Fence Installation	DAY	10	\$10,200	\$102,000
2.3 Hydroseeding	ACRE	0.5	\$10,000	\$5,000
2.4 Oversight/Supervision	DAY	10	\$900	\$9,000
2.5 Operations & Maintenance	YEAR	5	\$6,500	\$32,500
3.0 Reporting	LS	1	\$10,000	\$10,000
4.0 Per diem				\$9,800
4.1 M&IE	DAY	14	\$200	\$2,800
4.2 Lodging	DAY	14	\$500	\$7,000
TOTAL COST				\$198,800

Table C-2
Detailed Cost Estimate
Alternative 3 (MEC Removal) - A950 Spoils Pile and A22 Drainage Ditch EE/CA
NAS Key West, FL

Cost Estimate Assumptions				
quantity sediment (c.y.)				6510
quantity MDAS scrap mgmt/disposal (lbs.)				1000
number of weeks/days to excavate with armored equipment & mechanically screen				4/20
UXO Technicians (person)				5
Oversight / Supervision /Engineer (person)				4
total hours (10 hours/day)				200
Task Description	Unit	Quantity	Cost	Total
1.0 Planning documents				\$90,300
1.1 UFP-SAPP	LS	1	\$27,600	\$27,600
1.2 HASP	LS	1	\$20,000	\$20,000
1.3 MEC Mgmt & Contingency Plan	LS	1	\$5,800	\$5,800
1.4 SOP Development	LS	1	\$10,600	\$10,600
1.5 Siting Plan	LS	1	\$8,900	\$8,900
1.6 Safety Submission	LS	1	\$17,400	\$17,400
2.0 Implementation				\$1,210,800
2.1 Mobilization/Demobilization	EA	1	\$338,200	\$338,200
2.2 Screening and Demilitarization	DAY	20	\$38,000	\$760,000
2.3 Oversight/Supervision	DAY	20	\$5,020	\$100,400
2.4 Mapping & Surveying	LS	1	\$12,200	\$12,200
3.0 Reporting	LS	1	\$20,000	\$20,000
4.0 Per diem				\$56,000
4.1 M&IE	DAY	28	\$500	\$14,000
4.2 Lodging	DAY	28	\$1,500	\$42,000
TOTAL COST				\$1,377,100